

Unmanned Aerobot/Rover (Aerover) All-Terrain Blimps

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JPL is developing technology for unmanned aerobot/rovers, or Aerovers, for autonomous air, ground, and sea exploration of Saturn's moon, Titan, which has a thick, nitrogen atmosphere and cold hydrocarbon oceans.

(http://www.jpl.nasa.gov/adv_tech/balloons/outer.htm). Particular military spin-off applications include a **1-meter, radio-controlled micro blimp** that is complete with video imaging/transmitter system and a proprietary five-gram, biological dust and gas collector for remote, indoor building surveillance. Another potential military application is a **2.3-meter blimp that has an autonomous GPS guidance system** and can hover over specific ground areas while providing imaging or dropping small payloads (1.4 kg total system mass). These small blimps are especially well adapted for surveillance operation in buildings, tunnels, and caves.

JPL has also tested a **6-meter blimp that has a maximum speed of about 30 km/hr** and can carry a variety of payloads, including subsurface **radar that can view underground caves and inside buildings**. Since it can hover directly above the ground, instead of many kilometers altitude, its sensitivity is especially high (sensitivity is inversely proportional to the square of distance). The blimp is virtually invisible at night, extremely quiet, and is not detectable by radar, since it is fabricated from thin plastic film. The non-detectability by radar has been confirmed by the FAA, which requires us to fly specially fabricated radar reflectors on all our large balloon flights. The 6-meter blimp can be quickly deployed from the ground, or it can be dropped from high altitude and filled when close to the ground, while falling on a parachute. This type of blimp aerial deployment is planned on Titan, and has been demonstrated by JPL in California's Mojave Desert.

The 6-meter blimp and the smaller blimps have specially designed landing wheels which allow for optional travel on solid or liquid surfaces. All working blimp models are relatively inexpensive in that they are modifications of commercial radio-controlled blimp systems. A three-minute video of JPL's unmanned blimp capability has been prepared and can shown at the conference (JPL Video #2002_01_02, "Aerover Development at JPL").